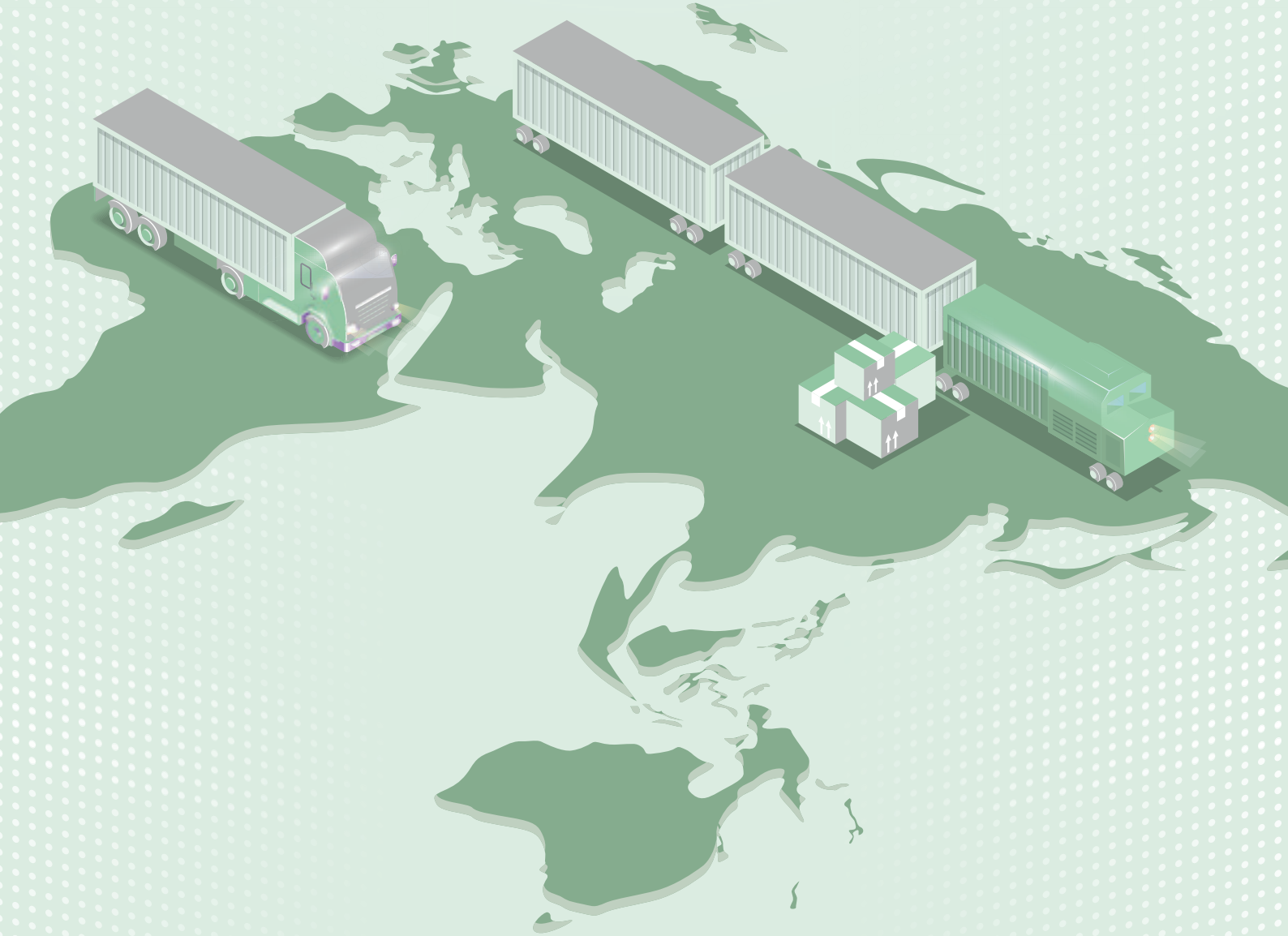
VISIONIAS
INSPIRING INNOVATION

QUICK REVISION MODULE (UPSC PRELIMS 2022)
GEOGRAPHY

LAND TRANSPORT : ROAD AND RAILWAYS TRANSPORT



VISIONIAS INSPIRING INNOVATION

LAND TRANSPORT

ADVANTAGES OF ROAD TRANSPORT

- Cheaper than Rail (Cost of construction, repair and maintenance)
- Door to door service No issue of loading and unloading at different places.
- Useful for transporting ephemeral goods (Truck farming)
- Easier to transport goods even in difficult terrains.
- Flexibility In schedules
- Best for short distance transportation

ROAD INFRASTRUCTURE IN INDIA

ADVANTAGE INDIA

ROBUST DEMAND

- Production of commercial vehicles increased to 752,022 in FY20, commanding a strong road network in India.
- In November 2020, passenger vehicle wholesale expanded by 9%, compared with the same month last year, due to increased demand in the festive season.

ATTRACTIVE OPPORTUNITIES

- The Government aims to construct 65,000 kms of national highways at a cost of Rs 5.35 lakh crore (US$ 741.51 billion) by 2022.
- Government of India allocated Rs. 111 lakh crore (US$ 1.4 trillion) under National Infrastructure Pipeline for FY 19-25. Roads sector to account for 18% of capital expenditure over FY 19-25

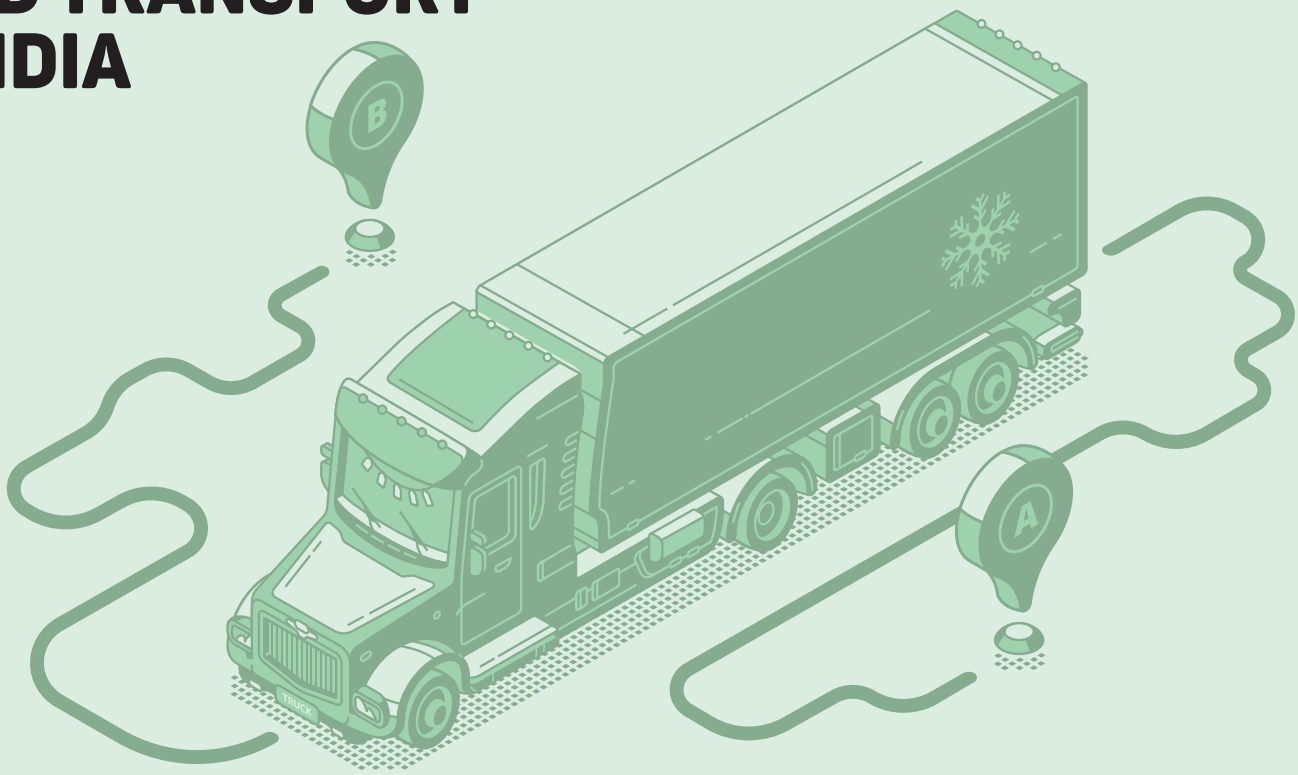
HIGHER INVESTMENTS

- Transfer to National Investment Fund (NIF) was estimated at Rs. 6,070 crore (US$ 868.51 million) for 2019-20.
- In April 2020, the Government set a target of constructing roads worth Rs. 15 lakh crore (US$ 212.80 billion) over the next two years.

POLICY SUPPORT

- 100% FDI is allowed under the automatic route subject to applicable laws and regulations.
- In December 2020, the MoRTH proposed to develop additional 60,000 kms of national highways (in the next five years).
- In January 2021, the Ministry of Road Transport and Highways (MoRTH) announced that it has sought a budgetary allocation of Rs 1.4 trillion for the next fiscal year (FY22)-about 40% higher than the FY21 allocation.

ISSUES IN ROAD TRANSPORT IN INDIA



UNSURFACED ROADS:
Unfit during the rainy season.

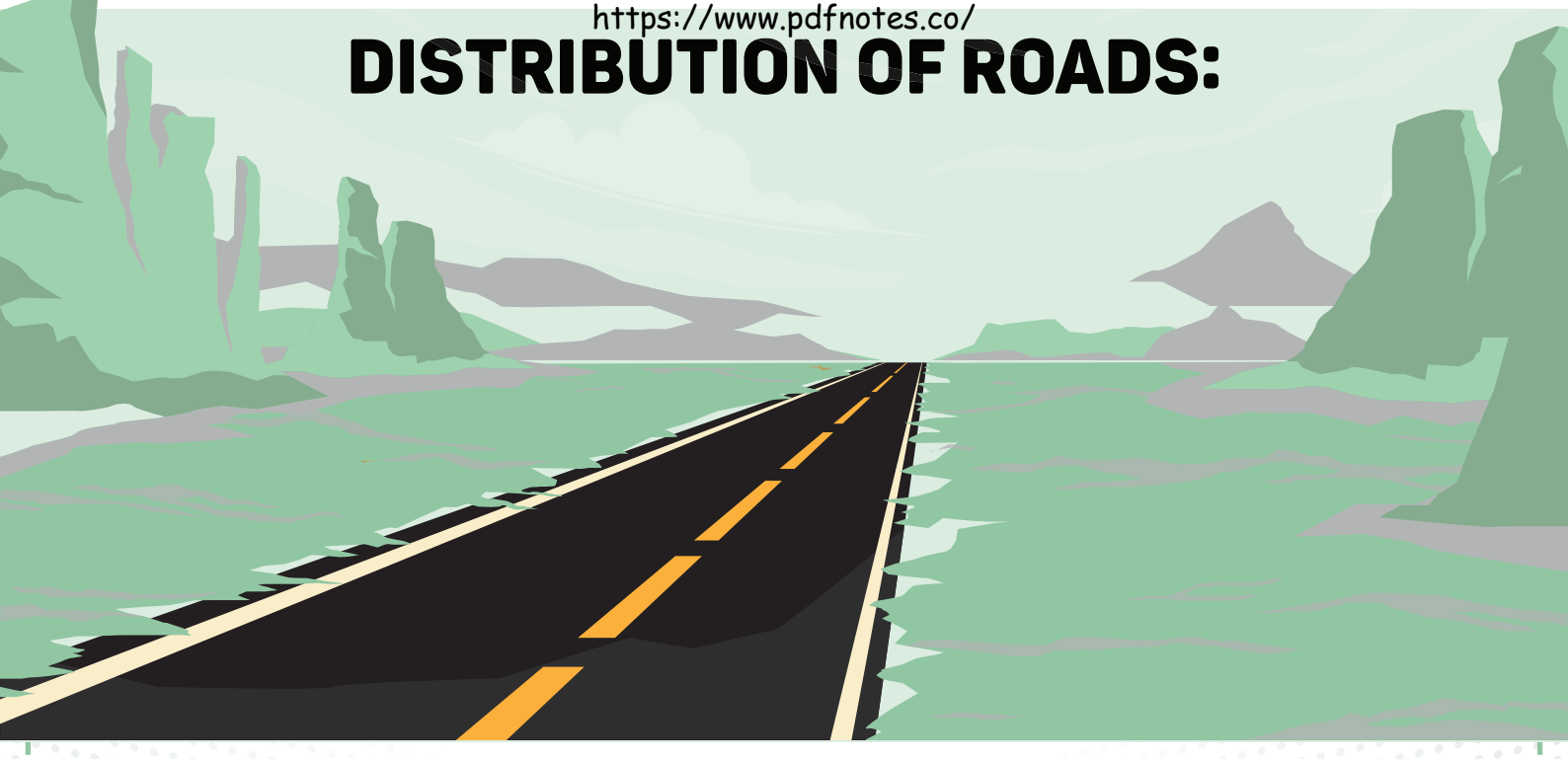
INADEQUATE CAPACITIES OF NHs:
The mixing of traffic by high speed cars, trucks, buses, tractors, two wheelers, animal driven vehicles, cyclists, etc. increases traffic time, congestion, pollution and road accidents.

BARRIERS:
Existence of multiple check posts and toll tax collection points.

MULTIPLE AGENCIES:
The planning, construction and maintenance of different types of roads are done by multiple agencies.

FUNDS:
There is a shortage of funds for the construction and maintenance of roads, even for highways, in India.

DISTRIBUTION OF ROADS:



- **GLOBALLY:** It is estimated that total length of roads in the world is three crore nine lakh km. Out of this only 1.5 crore km roads can be used in all seasons. The North American continent alone has 35 per cent of world's good roads.
- **IN INDIA:** India has the second largest road network in the world, spanning a total of 58.98 Lakh kilometers (2017). This road network transports 64.5% of all goods in the country and 90% of India's total passenger traffic uses road network to commute.

5. Indian road network as on 31.03.2017 was 58.98 lakh km. The break-up category-wise is given below :

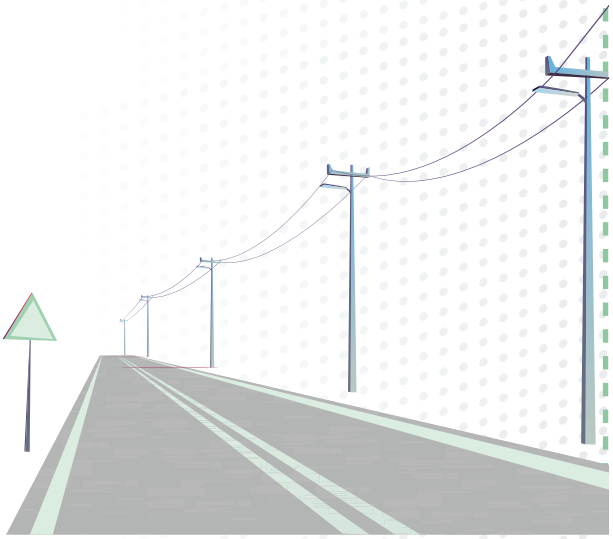
CATEGORY OF ROAD	LENGHTH OF ROADS (KM)	% SHARE OF TOTAL ROADS
National Highways (NHs)	1,14,158	1.94
State Highways (SHs)	1,75,036	2.97
District Roads	5,86,181	9.94
Rural Roads (including JRY Roads	41,66,916	70.65
Urban Roads	5,26,483	8.93
Project Roads	3,28,897	5.58
TOTAL	**58,97,671**	**100**

1. NATIONAL HIGHWAYS

- Constructed and maintained by the Central Government through National Highway Authority of India (NHAI).
- Connects the state capitals, important ports, major cities and railway junctions.
- The total length of the National Highways reached from 19,700 km in 1951 to 1,32,500 km by March, 2019.
- It constitutes around 2% Roads of the country. (Refer fig. category wise break-up).

2. THE STATE HIGHWAYS

- Constructed and maintained by the State Governments through their respective **PUBLIC WORKS DEPARTMENTS (PWD).**
- They provide linkages with the National Highways, district headquarters, important towns, tourist centres and minor ports.
- Their total length is about 1,75,000 Km in 2016-17.
- These constitute 3 per cent of total road length in the country.



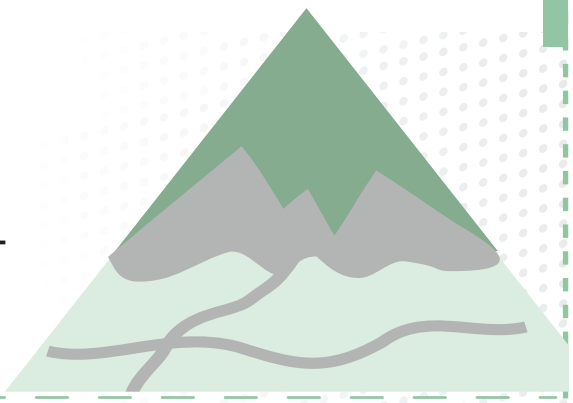
3. THE DISTRICT ROADS

- Constructed and maintained by **ZILA PARISHADS AND THE PUBLIC WORKS DEPARTMENTS.**
- The district roads mostly connect the district headquarters with the main towns and large villages within the districts.
- Now most of these roads are metalled roads and provide accessibility to the rural areas.
- Their total length is about 5,86,000 km in 2016-17.
- They account for 10 per cent of the total road length of the country.

4. THE VILLAGE ROADS

- Constructed and maintained by the Village Panchayat. They connect the villages with the neighboring towns and cities. All weather roads have been constructed under PM Grameen Sadak Yojana.
- Their total length is about 5,86,000 km in 2016-17.
- They constitute more than 70% of the total road length of the country.

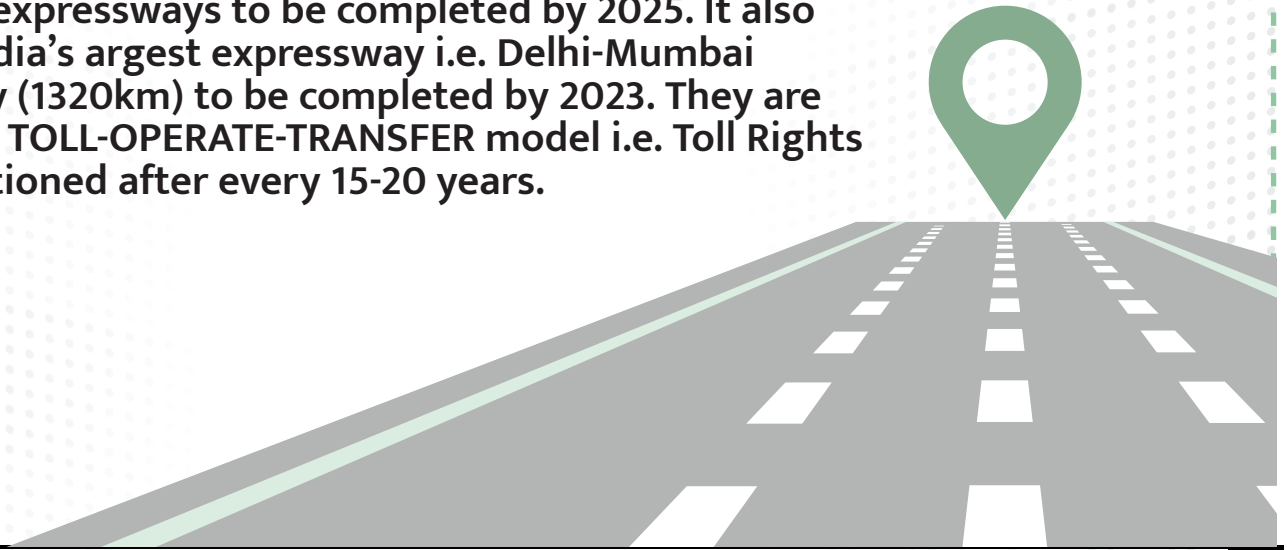
5. THE BORDER ROADS



- The Border Roads Organisation (BRO) was established in 1960 to plan and construct roads of strategic importance in the northern and north-eastern border areas of the country. The BRO also constructs road in high altitude mountainous areas and undertakes snow clearance there.

6. EXPRESSWAYS

- They are the highest class of roads in the Indian Road Network. Strategically built as even fighter jets have landed on Yamuna Expressway. It is a controlled-access highway i.e., it controls entrances to it and exits from it by incorporating the design of the slip roads for entry and exit into the design of the highway itself. Currently, 1642 Km Expressways have been built and in 2020 Government has proposed 22 new projects comprising 7500 km of greenfield expressways to be completed by 2025. It also includes India's argest expressway i.e. Delhi-Mumbai Expressway (1320km) to be completed by 2023. They are built under TOLL-OPERATE-TRANSFER model i.e. Toll Rights will be auctioned after every 15-20 years.



NATIONAL HIGHWAYS DEVELOPMENT PROJECT: (7 PHASES)

PHASE	DETAILS
NHDP PHASE I	This phase consists of **GOLDEN QUADRILATERAL NETWORK** comprising a total length of 5,846 km which connects the four major cities of Delhi, Chennai, Mumbai & Kolkata and 981 km of North-South and East-West corridor. NS-EW corridor connects Srinagar in the north to Kanyakumari in the south and Silchar in the east to Porbandar in the west. Phase I also includes improving connectivity to ports.
NHDP PHASE II	Phase II covers 6,161 km of the **NS-EW CORRIDOR** (The total NS-EW corridor consists of 7,142 km) and 486 km of other NHs.
NHDP PHASE III	**FOUR-LANING** of 12,109 km of high density national highways connecting state capitals and places of economic, commercial and tourist importance. Approved in 2007. BOT based.
NHDP PHASE IV	Upgradation of 20,000 km of **SINGLE-LANE ROADS TO TWO-LANE STANDARDS WITH PAVED SHOULDERS.** Built under BOT-Toll mode on DBFOT basis. (Approved in 2014)
NHDP PHASE V	**SIX-LANING** of 6,500 km of four-laned highways.
NHDP PHASE VI	Construction of 1,000 km of **EXPRESSWAYS** connecting major commercial and industrial townships.
NHDP PHASE VII	Construction of **RING ROADS, BY-PASSES, UNDER-PASSES, FLYOVERS,** etc. comprising 700 km of road network.

THE ASIAN HIGHWAY PROJECT

- Also known as the Great Asian Highway
- It is a cooperative project among countries in Asia and Europe and the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), to improve the highway systems in Asia.
- It is one of the three pillars of the Asian Land Transport Infrastructure Development (ALTID) project endorsed by the ESCAP commission at its 48th session in 1992, comprising Asian Highway, Trans-Asian Railway (TAR) and facilitation of land transport projects.
- Agreements have been signed by 32 countries to allow the highway to cross the continent and also reach to Europe. Some of the countries taking part in the highway project are India, Sri Lanka, Pakistan, China, Japan, South Korea and Bangladesh.
- Most of the funding comes from the larger, more advanced Asian nations like Japan, India and China as well as international agencies such as the Asian Development Bank.

ROUTES WHICH PASS THROUGH INDIA

AH1:	From Japan to Trans-European Motorway.
AH42:	This is the nearest Asian highway to Mount Everest. Connects China-India-Nepal.
AH43:	Connects Agra to Sri Lanka.
AH45:	Connects Kolkata-Bengaluru. Plan to cover Doha to Indonesia by 2050.
AH46:	Great Eastern Highway within India from its East Coast to West Coast. The road crosses five states such as West Bengal, Jharkhand, Odisha, Chhattisgarh and Maharashtra.
AH47:	Connects Gwalior to Bengaluru.
AH48:	Also called SAARC Road. 90Km stretch, connects Bhutan to India-Bangladesh Border, reached up to Cooch Behar, W.Bengal.

ADVANTAGES OF RAIL TRANSPORT

Environment friendly.

Safer than other types of transportation.

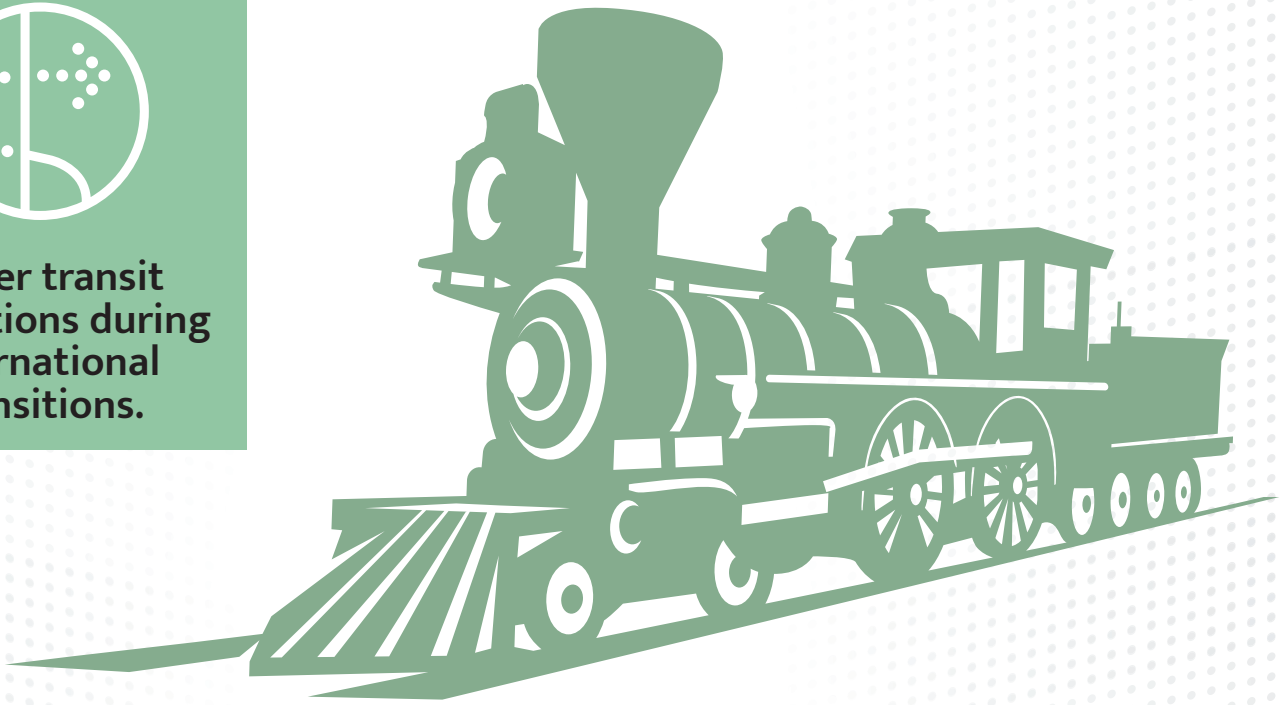
There is a long-term fixed price guarantee.

It is the mode least affected by bad weather conditions.

Suitable for mass transportation. Reduces the density caused by other types of transportation.

Most suitable type of transportation for heavy tonnage and bulky loads.

Lesser transit restrictions during international transitions.



INDIAN RAILWAYS INDUSTRY

ADVANTAGE INDIA

GROWING DEMAND

- Increasing urbanisation and rising income (both urban and rural) is driving growth in the passenger segment.
- India is projected to account for 40% of the total global share of rail activity by 2050.

ATTRACTIVE OPPORTUNITIES

- Freight traffic is set to increase significantly due to rising investment and private sector participation.
- Metro rail projects are being envisaged across many cities over the next ten years.

HIGHER INVESTMENTS

- FDI inflow in railway-related components stood at US$ 1.12 billion from April 2000 to September 2020.
- Rail infrastructure will see an investment of Rs 50 lakh crore (US$ 715.41 billion) by 2030.
- Railway infrastructure investment is expected to increase from US$ 58.96 billion in 2013- 17RE to US$ 124.13 billion by 2018-22E.^

POLICY SUPPORT

- The government has announced two key initiatives for seeking private investments-running passenger trains by private operators across the railways network and redevelopment of railway stations across the country. According to Indian Railways, these projects have the potential of bringing an investment of over US$ 7 .5 billion in the next five years.
- In July 2020, the Ministry of Railways has invited Request for Qualifications for private participation in operating passenger train services across 109 Origin Destination (OD) routes

LIMITATIONS OF RAIL TRANSPORT

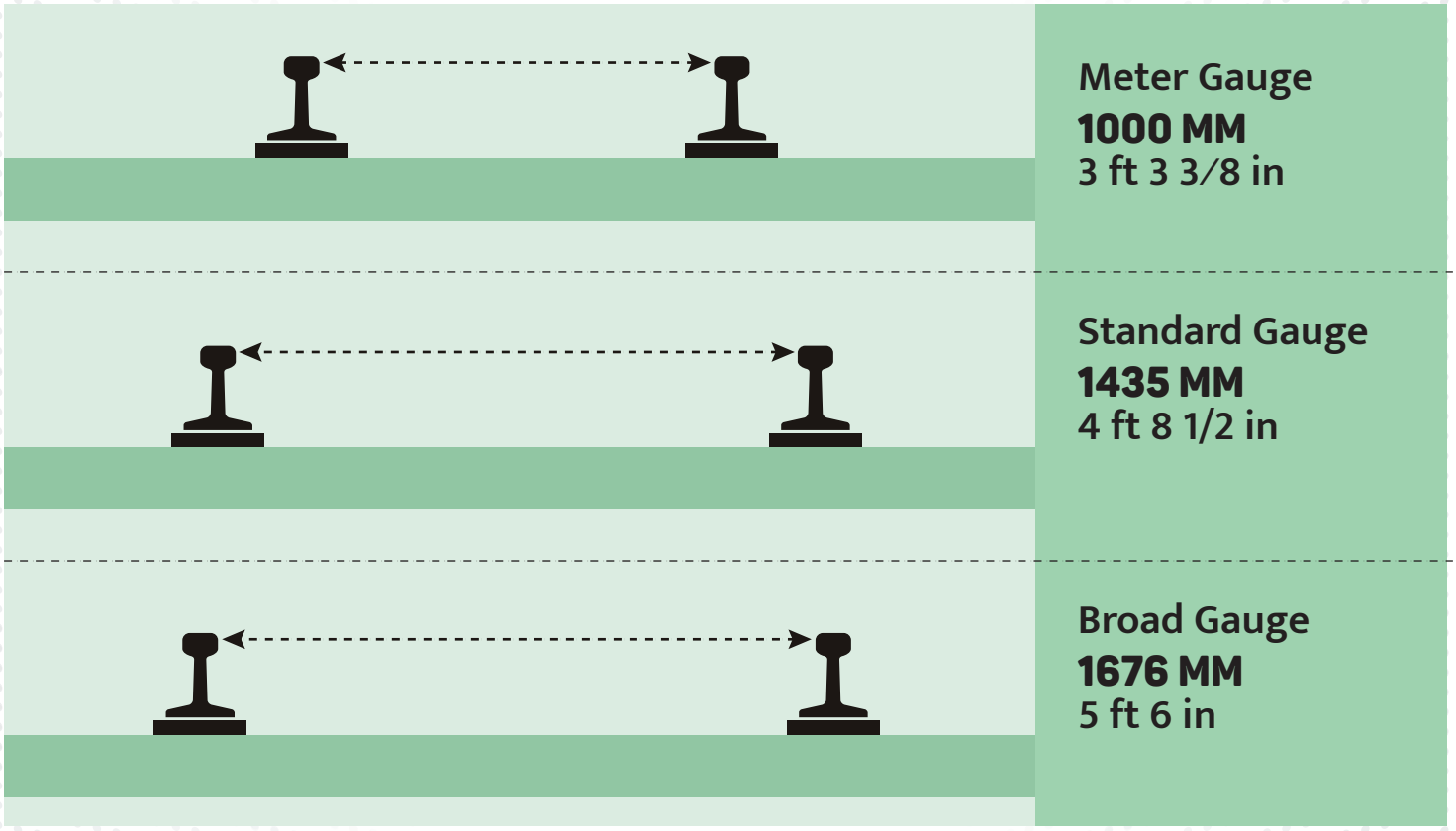
- Huge **CAPITAL INVESTMENT** required.
- Difficult to **CONSTRUCT AND MAINTAIN** rail routes in hilly terrains with steep slopes and deserts.
- Difficult to transport during **HEAVY RAINFALL AND SNOW-FALL.**
- Difficulty arises due to **DIFFERENT GAUGE OF RAILWAY LINES** i.e. broad, meter and narrow.
- **INCREASED EXPENDITURE** on loading and unloading as door to door service is not provided.

RAIL GAUGES

The gauge of a railway track is defined as the clear minimum perpendicular distance between the inner faces of the two rails.

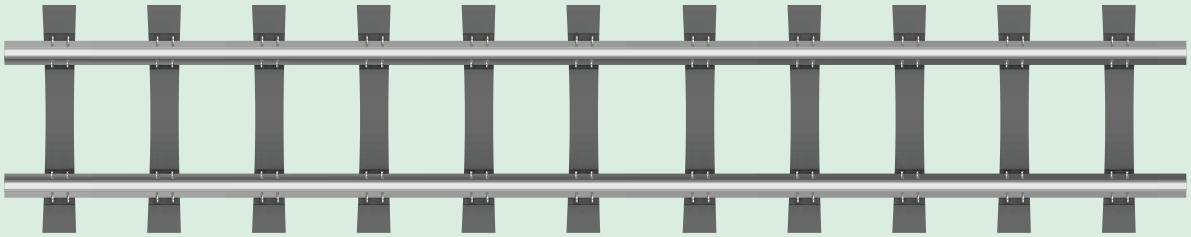
TYPES OF GAUGES:

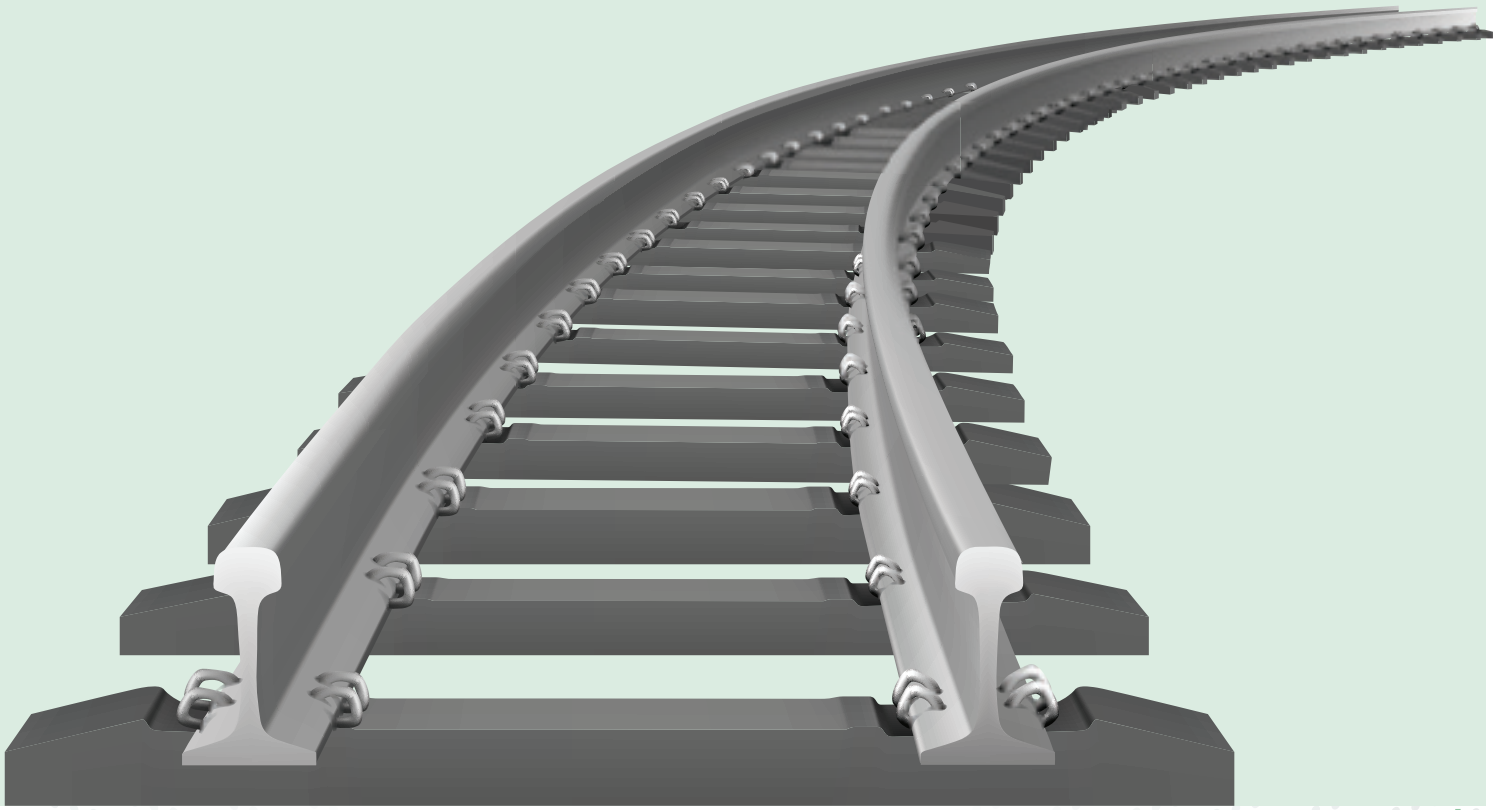
- **BROAD GAUGE:** Britishers introduced wide gauge in India for freight movement, and to ensure stability in the face of Indian weather and the perceived threat of cyclonic winds. At present Indian railways predominantly runs on the broad gauge covering more than 63,000 km out of the total 67,415 km rail route length in India .
- **STANDARD GAUGE:** Till 2010, only Tram in Kolkata ran on this gauge. At present, all metro lines are using this gauge.
- **METER GAUGE:** They were made to reduce the cost. Except the Nilgiri Mountain Railway which is a legacy run, all meter gauge lines in India will be converted into broad gauge under project Unigauge.
- **NARROW GAUGE:** Used in difficult terrains. The Darjeeling Mountain Railway has been declared UNESCO World Heritage.



FACTORS AFFECTING THE RAILWAY GAUGE:

- **TRAFFIC CONDITIONS:** If the traffic intensity is likely to be high on the track, then the broad gauge will be appropriate instead of the standard gauge.
- **COST OF TRACK:** The cost of the railway track is directly proportional to the width of its gauge. If available funds are not enough to make standard gauge and there is no railway line in the area, then the metre gauge or narrow gauge is preferred.
- **SPEED OF THE TRAIN:** The wheel's diameter is usually 0.75 times the width of the gauge and thus, the speed of the train is almost proportional to the gauge.If higher speeds are to be achieved then the broad gauge track is given the priority instead of metre gauge or narrow gauge track.
- **GEOGRAPHICAL CONDITION:** In mountainous regions, it is advisable to have a narrow gauge of the track since it is more flexible and can be laid to a smaller radius on the curves.



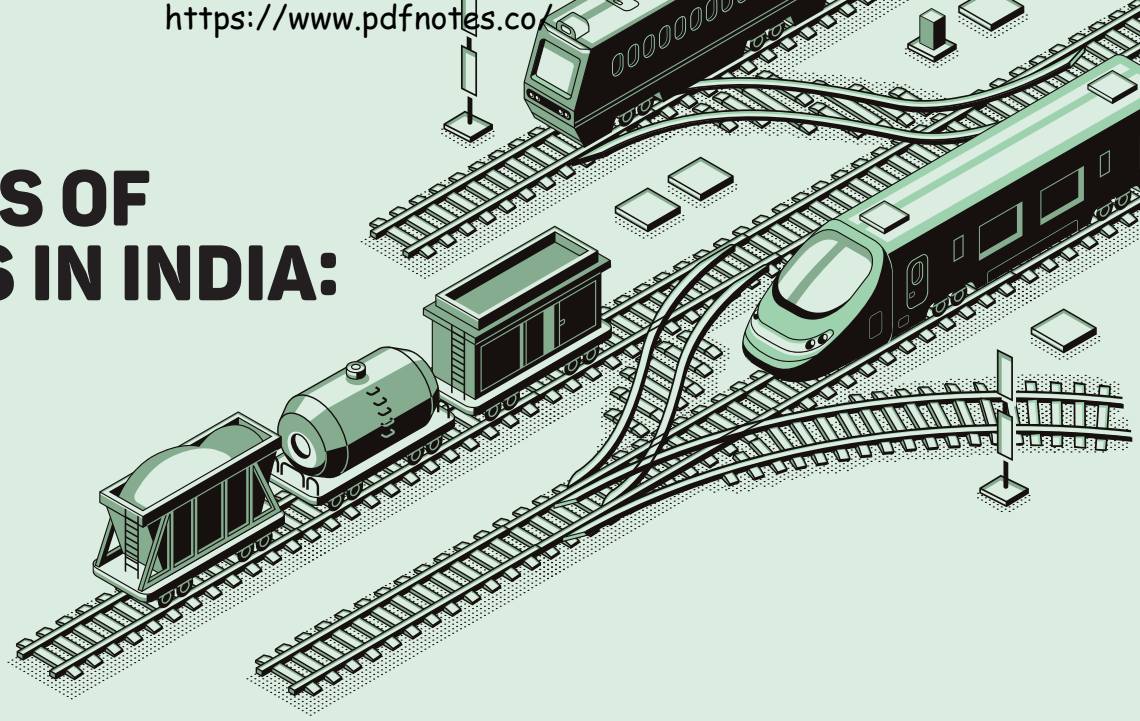


DISTRIBUTION OF RAILWAYS IN THE WORLD

INTERCONTINENTAL RAIL ROUTES

- **TRANS-SIBERIAN RAILWAY:** This route was constructed for connecting European Russia to Siberia or Asian Russia. It is the most important route in Asia and the longest (9,332 km) doubletracked and electrified trans– continental railway in the world. It has helped in opening up its Asian region to West European markets. Its development is on account of economic, political and defense reasons.
- **CANADIAN PACIFIC RAILWAY:** This 7,050 km long rail-line in Canada runs from Halifax in the east to Vancouver on the Pacific Coast. It gained economic significance because it connected the Quebec-Montreal Industrial Region with the wheat belt of the Prairie Region and the Coniferous Forest region in the north.
- **AUSTRALIAN INTERCONTINENTAL RAIL ROUTE:** The main purpose of constructing this was to connect the Western Australia to east Australian states.
- **THE UNION AND PACIFIC RAILWAY:** This rail-line connects New York on the Atlantic Coast to San Francisco on the Pacific Coast. The most valuable exports on this route are ores, grain, paper, chemicals and machinery.
- **TRANS-ASIATIC RAILWAY:** A UNESCAP assisted rail project for linking Istanbul with Bangkok via Iran, Pakistan, India, Bangladesh and Myanmar has been pending since a very long time.
- The Qinghai-Tibet railway is the highest altitude railways of the world.
- North America has the densest rail route network in the world. About 40 per cent rail routes of the world are found in this continent.

PROBLEMS OF RAILWAYS IN INDIA:



- Overburdened Rail network.
- Less reach of railways in areas having unfavorable geographical conditions.
- Stiff competition from road transport
- Overburdened with surplus staff on its regular pay roles.
- Political pressure and interference leads to development of uneconomic projects.
- Huge outstanding payments to diesel and electric power supply companies.
- Most of the equipment used by the railways are now obsolete and need immediate replacements.
- Faces deficit due to cheap fares and tariffs imposed.